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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/608,281

06/27/2003

Daniel N. Harres

BO1-0186US

8539

60483

7590

04/24/2008

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EXAMINER

LIU, LI

ART UNIT

PAPER NUMBER

2613

MAIL DATE

DELIVERY MODE

04/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/608,281	Applicant(s) HARRES, DANIEL N.	
	Examiner LI LIU	Art Unit 2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,7-10,12-21,23-29,31-35,37-40,42 and 43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,7-10,12-21,23-29,31-35,37-40,42 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on 2/1/2008 with respect to claims 1-5, 7-10, 12-21, 23-29, 31-35, 37-40, 42 and 43 have been fully considered but they are not persuasive. The examiner has thoroughly reviewed Applicant's amendment and arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

1). Applicant's argument – "Generally, Applicant's invention relates to a method and/or apparatus to compare the noise level to a threshold value for a receiver to prevent the receiver from reaching saturation, a condition relevant to aircraft which experience large temperature variations while in operation. The relied upon references cited in the rejection do not teach, suggest, or even address a similar problem". "As applied to the instant rejection, Applicant respectfully submits that the application of the apparatus, as recited in claim 1, is beyond the skill of a person of ordinary skill in the art because that person would not consider 1) environments having extreme temperature variations in which the apparatus may be operated, and 2) the advantages of comparing noise level with a threshold to advantageously improve the apparatus's operation in environments subjected to extreme temperature variations".

Examiner's response – In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "an aircraft which experience large temperature variations while in operation" and "environments having extreme temperature variations in which

the apparatus may be operated”) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The claims never recite that the "apparatus" is operated in an environments having extreme temperature variations. And the independent claims 1, 16 and 32 do not claim an aircraft. Claim 24 has the limitations “A vehicle, comprising: a fuselage and a propulsion system operatively coupled to the fuselage”. But, not all vehicles with a fuselage are operated in an environments having extreme temperature variation.

2). Applicant’s argument – “the Office suggests that the “threshold value” can be inferred in Arnon”. “Further, case law supports Applicant's position: "Inherency...may not be established by probabilities or possibilities. The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient." (*In re Oelrich*, 666 F.2d 578,581, 212 USPQ 323, 326 (C.C.P.A. 1981) *citing Hansgirk v. Kemmer*, 102 F.2d 212, 214, 40 USPQ 665, 667 (C.C.P.A. 1939), emphasis added.) .

Examiner’s response – Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference value or threshold has been used in Arnon’s system to make a decision to adjust the gain. For control purpose, a criteria must be used to judge the level of the noise so to control the operation of the device being controlled.

3). Applicant’s argument – “Next, the Office relies on Nakano as teaching a threshold value because Nakano discloses a feedback loop, relying on Figures 1 and 2

in Nakano. (Office Action, page 4, lines 7-14). Figure 1 of Nakano and the description do not teach or suggest "compare the noise level." Even more importantly, in Figure 2 of Nakano, the feedback control circuit (element 4) is completely separated from the noise detection circuit (element 6). Therefore, Applicant is unsure how the noise detection circuit could possibly operate within the feedback control circuit because of the separation between the components in the circuit of Nakano. Therefore, Applicant respectfully submits that the combination of Nakano and Arnon is improper".

Examiner's response – Nakano teaches a noise detection circuit and an alarm circuit that receives the noise detection signal, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse when the number of the counted noise pulses reaches a preset value". The alarm signal indicates the "noise level". Therefore, it is obvious that the alarm signal can be used for the control purpose. The combination of Arnon and Nakano will put the noise detection circuit in the feedback control circuit of Arnon (e.g., within the CONTROL 156 of Figure 3).

4). Applicant's argument – "Moving to motivation, the Office includes a statement of motivation which states, "Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value in the system of Amon so that the gain of the APD can be better controlled and the signal quality can be improved." Applicants respectfully suggest that this statement is conclusory and does not pinpoint motivation from either Arnon or Nakano, or one of ordinary skill in the art".

Examiner's response – Nakano discloses “the circuit for monitoring the optical signal level according to the present invention may count the number of the surge noises, which are increased as the input optical signal level is lowered, and output the alarm pulses. The circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability” (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not “complex” (column 1, line 46-48). These advantages provides the motivation to combine the Nakano with Arnon.

5). Applicant's argument – “Finally, Applicant request reconsideration of the recitation "wherein the monitoring component includes a condition determining component configured to determine at least one of a presence or an absence of light at the receiver," as included in amended claim 1. In particular, Applicant requests the Office to provide a pinpoint reference to this disclosure in Harres or another prior art reference. As recited, Applicant submits that the relied upon art fails to teach this limitation”.

Examiner's response – Harres discloses a condition determining component configured to determine at least one of a presence (the phase segment illuminated) or an absence of light at the receiver (the phase segment of dark, column 3 line 2-33, and Figure 3; and column 9, line 50-65).

6). Applicant's argument – “Finally, Applicant respectfully submits that none of the relied upon prior art references specifically states forming the "ration" by averages of the "high-state" and "low-state," as recited in claim 16”.

Examiner's response – Harres discloses a high energy calculation component configured to compute average energy for the high-state and low state (column 3 line 2-33, also refer to Equation (4)). Harres provide a more reliable method and apparatus for detecting and decoding digital signals; and “[i]t is a further object of the invention to provide a method and apparatus for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate”. That is, the "ration" is provided by Harres.

7). Applicant's argument – “Applicant requests that the Office point to motivation in Hall or the other reference, or another known source which provides motivation for this combination of the apparatus in a vehicle, as recited in claim 24”.

Examiner's response – The combination of Arnon and Nakano and Harres and Saunders et al disclose an integrated, simple, reliable method and apparatus for detecting and decoding digital signals and for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate. Due to these advantage, the system of Arnon and Nakano and Harres and Saunders et al can be used anywhere desired to detect noise and feedback control, including the aircraft.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Nakano (US 6,795,675) and Harres (US 6,128,112).

1). With regard to claim 1, Arnon et al discloses an apparatus (Figure 3), comprising:

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive an optical signal and to convert the optical signal to a corresponding electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) configured to calculate a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, page 10-11, [0237]-[0239]) and to adjust a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, (A) Arnon does not expressly state to compare the noise level with a threshold value; and (B) Arnon does not expressly disclose wherein the monitoring component includes a condition determining component configured to determine at least one of a presence or an absence of light at the receiver.

With regard to item (A), however, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference

value or threshold must have been used in Arnon's system to make a decision to adjust the gain. For control purpose, a criteria must be used to judge the level of the noise so to control the operation of the device being controlled. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4".

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability" (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not "complex" (column 1, line 46-48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value in the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved and also the system can be made simpler and more reliable.

With regard to item (B), however, Harres discloses a condition determining component configured to determine at least one of a presence or an absence of light at the receiver (column 3 line 2-33, and Figure 3), the condition determining component determines the states of the signal: high state and low state; and power determining

means for determining the power of the respective noise portions of the two phase segments.

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the condition determining component as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 2, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses a transmitter (e.g., Figure 4, the emitter 52) configured to transmit the optical signal to the receiver.

3). With regard to claim 3, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the monitoring component is further configured to adjust an amplification of the transmitter (the Power Attenuator 49 sets a power output of emitter 52 in Figure 4) based on the noise level (page 11, [0241]-[0243]).

4). With regard to claim 4, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the receiver includes a photodiode (Figure 3, the Avalanche Photodiode 150).

5). With regard to claim 5, Arnon et al and Nakano and Harres discloses all of the subject matter as applied to claim 1 above. And Arnon et al and Nakano and Harres further disclose wherein the monitoring component is configured to monitor an output

voltage of the electrical signal and to adjust at least one of an amplification of the transmitter (page 10-11, [0237]-[0239]) and a gain of the receiver to maintain a desired RMS level of a electrical signal (Harres: column 10, line 11-28).

6). With regard to claim 7, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

7). With regard to claim 8, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claims 1 and 7 above. And Arnon et al and Nakano and Harres et al discloses wherein the noise energy calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval (Harres: column 7, line 3-23, and Figure 3).

8). With regard to claim 9, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claims 1, 7 and 8 above. And Arnon et al and Nakano and Harres further disclose wherein the noise energy calculation component includes a subtractor component (Harres: column 10 line 20) that receives a state indicator signal (Harres: column 3 line 2-33) and subtracts a high-state +A or a low-state -A state from the electrical signal based on the state indicator signal (Harres: the state indicator determines the states or phase of the optical signal: light (or high) and dark (or low) portions; and power determining means for determining the power of the respective noise portions of the two phase segments, Figure 3).

As disclosed by Arnon et al, the level measured by detector 154 is an average level, the type and parameters of the averaging being set by CPU 81. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the subtractor and state indicator as taught by Harres to the system of Arnon et al and Nakano so that the noise energy calculation component includes a subtractor component that receives a state indicator signal and subtracts a high-state or a low-state from the electrical signal based on the state indicator signal, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

9). With regard to claim 10, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claims 1 and 7-9 above. And Arnon et al and Nakano and Harres further disclose wherein the noise energy calculation component includes a squaring function that squares an output from the subtractor component and transmits the squared output to the integrate-and-dump circuit (Harres: column 7, line 3-31).

10). With regard to claim 12, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. Arnon et al and Nakano and Harres further disclose wherein the monitoring component includes a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (column 3 line 2-33, and Figure 3, power determining means for determining the power of the respective noise portions of the two phase segments).

3. Claims 32-35, 38-40, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Nakano (US 6,795,675) and Harres (US 6,128,112) and Saunders (US 6,259,542).

1). With regard to claim 32, Arnon et al disclose a method of controlling an output of an optical system, comprising:

receiving an optical signal with a receiver (Avalanche Photodiode 150 receives optical signal, Figure 3);

converting the optical signal to a corresponding electrical signal (Avalanche Photodiode 150 converts optical signal into an electrical signal, Figure 3);

calculating (the Detector 154 and Controller 156 in Figure 3; the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise, page 10-11, [0237]-[0239]) a noise level of at least a portion of the electrical signal; and

adjusting at least one of an amplification of the optical signal and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, (A) Arnon does not expressly state to compare the noise level with a threshold value; and (B) Arnon et al does not expressly disclose wherein calculating the noise includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio

of the average energies for the high- and low-states A, -A with a predetermined threshold.

With regard to item (A), however, since Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, it is obvious that a reference value or threshold must have been used in Arnon's system to make a decision to adjust the gain. For control purpose, a criteria must be used to judge the level of the noise so to control the operation of the device being controlled. Another prior art, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to control the gain of the APD. And Nakano also teaches "[t]he alarm circuit 7 receives the noise detection signal 105, counts the noise pulses generated within a predetermined period, and outputs an alarm pulse 107 when the number of the counted noise pulses reaches a preset value. When the level of the optical signal input to the APD 2 is lowered or becomes zero, the APD 2 increases the amplification factor of the optical signal based on the control signal from the feedback control circuit 4".

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability" (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not "complex" (column 1, line 46-48). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value in the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved and also the system can be made simpler and more reliable.

With regard to item (B), however, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders to the system of Arnon et al and Nakano so that the gain of the APD can be better controlled and the signal qual and reliability can be improved.

2). With regard to claim 33, Arnon et al and Nakano and Harres and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further

discloses the method further including transmitting (e.g., Figure 4, the emitter 52) the optical signal to the receiver (Figure 4).

3). With regard to claim 34, Arnon et al and Nakano and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with a photodiode (Figure 3, the Avalanche Photodiode 150).

4). With regard to claim 35, Arnon et al and Nakano and Harres and Saunders discloses all of the subject matter as applied to claim 32 above. And Arnon et al and Nakano and Harres and Saunders further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter (page 10-11, [0237]-[0239]) and a gain of the receiver to maintain a desired RMS level of a electrical signal (Harres: column 10, line 11-28).

5). With regard to claim 38, Arnon et al and Nakano and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein monitoring a noise level of at least a portion of the electrical signal includes calculating a noise energy level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

6). With regard to claim 39, Arnon et al and Nakano and Harres and Saunders disclose all of the subject matter as applied to claims 32 and 38 above. And Arnon et al and Nakano and Harres et al and Saunders further discloses wherein the noise energy

calculation component includes an integrate-and-dump circuit that integrates an energy value over a bit interval (Harres: column 7, line 3-23, and Figure 3).

7). With regard to claim 40, Arnon et al and Nakano and Harres and Saunders disclose all of the subject matter as applied to claims 32 and 38 above. And Arnon et al and Nakano and Harres and Saunders further disclose wherein the noise energy calculation component includes a subtractor component (Harres: column 10 line 20) that receives a state indicator signal (Harres: column 3 line 2-33) and subtracts a high-state +A or a low-state -A state from the electrical signal based on the state indicator signal (Harres: the state indicator determines the states or phase of the optical signal: light (or high) and dark (or low) portions; and power determining means for determining the power of the respective noise portions of the two phase segments, Figure 3).

8). With regard to claim 42, Arnon et al and Nakano and Harres and Saunders disclose all of the subject matter as applied to claim 32 above. And Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al does not expressly disclose the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and

power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Nakano so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

9). With regard to claim 43, Arnon et al and Nakano and Harres and Saunders disclose all of the subject matter as applied to claim 32 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one

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of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state -A (36 in Figure 3).

And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a comparator and a predetermined threshold to the system of Arnon et al so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

4. Claims 16, 18-21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Harres (US 6,128,112) and Saunders (US 6,259,542) and Nakano (US 6,795,675).

1). With regard to claim 16, Arnon et al discloses an optical system, comprising:
a transmitter (e.g., Figure 4, the emitter 52) configured to transmit an optical signal;

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive the optical signal and to output an electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) configured to monitor a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3) and to adjust at least one of an amplification of the transmitter and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11,

[0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon et al does not expressly disclose the amplification of the transmitter or the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Nakano discloses that the circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the

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optical signal with reliability” (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not “complex” (column 1, line 46-48). Harres provide a more reliable method and apparatus for detecting and decoding digital signals; and “[i]t is a further object of the invention to provide a method and apparatus for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate”.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 18, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the receiver includes an avalanche photodiode (Figure 3, the Avalanche Photodiode 150).

3). With regard to claim 19, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239]).

But, Arnon et al does not teach to adjust the gain to maintain a desired RMS level of the electrical signal.

However, to use the RMS as a criterion to make an automatic control is a well known technique, Harres discloses a system and method to maintain a desired RMS level of a electrical signal (column 10, line 11-28).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

4). With regard to claim 20, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

5). With regard to claim 21, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the

low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

6). With regard to claim 23, Arnon et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 16 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining

component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state -A (36 in Figure 3).

Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2),

which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a comparator and a predetermined threshold to the system of Arnon et al so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved

5. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al and Nakano and Harres as applied to claim 1 above, and in further view of Saunders (US 6,259,542).

1). With regard to claim 13, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Nakano so that the gain of the APD can be better controlled and the signal quality and reliability can be improved.

2). With regard to claim 14, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. And Arnon et al disclose wherein the monitoring component is configured to reduce at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

Arnon et al does not expressly disclose the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

Another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Nakano so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

3). With regard to claim 15, Arnon et al and Nakano and Harres disclose all of the subject matter as applied to claim 1 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state -A (36 in Figure 3).

And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of

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a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a comparator and a predetermined threshold to the system of Arnon et al so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

6. Claim 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al and Nakano and Harres and Saunders as applied to claim 32 above, and in further view of Traa (US 6,222,660).

Arnon et al and Nakano discloses all of the subject matter as applied to claim 32 above. And Arnon et al further discloses wherein receiving an optical signal with a receiver includes receiving an optical signal with an avalanche photodiode (Figure 3, APD 158).

But, Arnon does not expressly disclose wherein comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode.

However, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the

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APD. And another prior art, Traa, teaches a breakdown threshold of the avalanche photodiode (Figure 2, the point 48, column 3, line 17-21) so to control the bias voltage from the adaptive power supply.

Arnon teaches to calculate the noise level and use the calculation to control the gain of the APD, a reference value or threshold must have been used in Arnon's system to make a decision to adjust the gain. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply a threshold value or breakdown threshold as taught by Nakano and Traa to the system of Arnon et al so that comparing the calculated noise level with a threshold value includes comparing the calculated noise level with a breakdown threshold of the avalanche photodiode; and then the gain of the APD can be better controlled and the signal quality can be improved.

7. Claims 24, 26-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al (US 2002/0114038) in view of Hall et al (US 6,577,419) Harres (US 6,128,112) and Saunders (US 6,259,542) and Nakano (US 6,795,675).

1). With regard to claim 24, Arnon et al discloses an optical system (Figures 2 and 3) configured to transmit signals, the optical system including, comprising:

a transmitter (e.g., Figure 4, the emitter 52) configured to transmit an optical signal; and

a receiver (Avalanche Photodiode 150 in Figure 3) configured to receive the optical signal and to output an electrical signal; and

a monitoring component (the Detector 154 and Controller 156 in Figure 3) configured to monitor a noise level of at least a portion of the electrical signal (the monitoring signal is part of the electrical signal split from the output of amplifier 152, Figure 3) and to adjust at least one of an amplification of the transmitter and a gain of the receiver based on the noise level (page 10-11, [0237]-[0239], the gain of the APD is set according to the optical power level, the background noise level, and the aggregate noise).

But, Arnon et al does not disclose (A) a vehicle, comprising: a fuselage and a propulsion system operatively coupled to the fuselage; and the optical system is used in the vehicle; (B) the amplification of the transmitter or the gain is adjusted when a ratio of an average energy of a high-state A of the electrical signal and an average energy of a low-state A of the electrical signal is greater than a predetermined threshold.

With regard to item (B), however, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor.

And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-

37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Nakano discloses a circuit for monitoring the optical signal level may be readily integrated and detect the reduction in the optical signal level or break in the optical signal with reliability" (column 5, line 59-65); and compared with other procedure, Nakano's circuit is not "complex" (column 1, line 46-48). Harres provide a more reliable method and apparatus for detecting and decoding digital signals; and "[i]t is a further object of the invention to provide a method and apparatus for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall et al so that the gain is adjusted when a ratio of an average energy of a high-state of the electrical signal and an average energy of a low-state of the electrical signal is greater than a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality and reliability can be improved.

With regard to item (A), however, Hall et al discloses an aircraft (the aircraft comprises inherently the fuselage and propulsion system operatively coupled to the fuselage) and the fiber optics including the transmitter, receiver and APD are installed in the aircraft (Figure 1, column 4, line 19-39 and column 5, line 6-8).

The combination of Arnon and Nakano and Harres and Saunders et al disclose an integrated, simple, reliable method and apparatus for detecting and decoding digital signals and for reliably detecting low level signals by increasing the gain of the detector without unduly increasing the bit error rate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the feedback system as taught by Arnon et al to the aircraft so that the gain of the APD can be better controlled and the signal quality and reliability can be improved, and the detection system can be made compact and simpler.

2). With regard to claim 26, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claims 24 above. And Arnon et al further discloses wherein the receiver includes an avalanche photodiode (Figure 3, the Avalanche Photodiode 150).

3). With regard to claim 27, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. And Arnon et al further disclose wherein the monitoring component is configured to monitor an output voltage of the electrical signal and to adjust at least one of an amplification of the transmitter and a gain of the receiver (page 10-11, [0237]-[0239]).

But, Arnon et al does not teach to adjust the gain to maintain a desired RMS level of the electrical signal.

However, to use the RMS as a criterion to make an automatic control is a well known technique, Harres discloses a system and method to maintain a desired RMS level of a electrical signal (column 10, line 11-28).

Harres provides a reliable detection and decoding method even at low power levels. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the RMS as taught by Harres to the system of Arnon et al so that the gain of the APD can be better controlled and the signal quality can be improved.

4). With regard to claim 28, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claims 24 above. And Arnon et al further discloses wherein the monitoring component includes a noise energy calculation component configured to calculate a calculated noise level of at least a portion of the electrical signal (page 10-11, [0237]-[0239], the noise level and aggregate noise are calculated).

5). With regard to claim 29, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. But, Arnon et al does not expressly disclose wherein the monitoring component includes: a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy

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for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres discloses a high energy calculation component configured to compute average energys for the high-state and low state (column 3 line 2-33), and power determining means for determining the power of the respective noise portions of the two phase segments (Figure 3). And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the ratio of the average energies for the high- and low-states to control the gain of the APD.

And Nakano discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/or predetermined threshold to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall so that the gain of the APD can be better controlled and the signal quality can be improved.

6). With regard to claim 31, Arnon et al and Hall et al and Harres and Saunders and Nakano disclose all of the subject matter as applied to claim 24 above. But Arnon et al does not expressly disclose wherein the monitoring component includes: a condition determining component configured to determine at least one of a presence or an absence of light at the receiver; a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal; a high energy calculation component configured to compute an average energy for the high-state A; a low energy calculation component configured to compute an average energy for the low-state -A; and a comparator configured to compare a ratio of the average energies for the high- and low-states A, -A with a predetermined threshold.

However, Harres et al discloses a method and system wherein the monitoring component includes: a condition determining component (column 3 line 2-33, and Figure 3) configured to determine at least one of a presence or an absence of light at the receiver (Figure 3, the condition determining component determines the states of the signal: high state and low state); a state means calculation component configured to compute at least one of a high state means and a low state means of the electrical signal (Figure 3, the state means calculate power of the signals at high and low states); a high energy calculation component configured to compute an average energy for the high-state A (34 in Figure 3); a low energy calculation component configured to compute an average energy for the low-state -A (36 in Figure 3).

And Harres teaches that the signal-to-noise ratio is used for calculating weight factor. And another prior art, Saunders uses a ratio between a detected energy level of

a soliton pulses and a detected energy level of the dispersive wave for controlling the gain of an amplifier (Figures 3 and 4, column 5, line 48-58, column 6 line 26-37, and column 7, line 31-49); and a reference value or threshold is used in Saunders' system to make decision as to whether the control device should be activated (column 9, line 26-37). Also, Nakano, discloses a feedback control circuit (Figures 1 and 2), which uses a reference voltage/threshold to be compared and then to control the gain of the APD.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the ratio of the energy states and a comparator and a predetermined threshold as taught by Harres and Saunders and Nakano to the system of Arnon et al and Hall so that comparator to compare a ratio of the average energies for the high- and low-states with a predetermined threshold, and then the gain of the APD can be better controlled and the signal quality can be improved.

8. Claims 17 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon et al and Hall and Harres and Saunders and Nakano as applied to claims 16 and 24 above, and in further view of Tomooka et al (US 6,266,169).

Arnon et al and discloses and all of the subject matter as applied to claims 16 and 24 above. But Arnon et al does not expressly teach wherein the transmitter includes an optical amplifier.

However, Tomooka et al discloses a transmitter including an optical amplifier (Figure 1, the optical amplifier 14 or 2). The optical amplifier is a well known device in the optical communications, Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a optical amplifier in the system

of Arnon et al so that the required input optical power can be obtained, and noise can be better controlled and the signal quality can be improved.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Pulics (US 5,270,533) discloses a stabilization biasing circuit for APD for aircraft.

Glance et al (US 5,907,569) discloses a control circuit for photodiode.

Urala (US 4,805,236) discloses a bias control for photodiode.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
April 22, 2008

/Kenneth N Vanderpuye/
Supervisory Patent
Examiner, Art Unit 2613